

REMARKS/ARGUMENTS

Claims 1-14 and 18-36 are active in this application, claims 15-17 and 37-40 having been cancelled. No new matter has been added by these amendments.

The present invention relates to a method for electroblowing fibers comprising:

forcing a polymer fluid through a spinneret in a first direction towards a collector located a first distance from the spinneret, to form fibers, while simultaneously blowing a gas through an orifice that is substantially concentrically arranged around the spinneret, wherein the gas is blown substantially in the first direction to contact the fibers;

wherein an electrostatic differential is generated between the spinneret and the collector; and

collecting the fibers;

wherein the polymer fluid comprises a member selected from the group consisting of hyaluronan, copolymers of hyaluronan and mixtures thereof.

One of the important aspects of the present invention is that the claimed process is particularly useful for the production of nanofibers made of hyaluronan containing polymers. As disclosed in the present application this is especially important, since hyaluronan is known to have unusually high viscosity making it difficult to prepare a highly concentrated solution, and hyaluronan solution shows a high surface tension. This results in making hyaluronan containing polymers very difficult to process using conventional spinning techniques. As disclosed in the present application (and contrary to the mention of hyaluronan in the Gravett et al application), it is known in the art that spinning hyaluronan using conventional electrospinning can be done, but only with minimal success, at low throughput. Melt blowing of hyaluronan is relatively out of the question, since hyaluronan has much too high a viscosity for use of a melt process. Applicants have found that by use of electroblowing as

described in the present application, it is possible to produce, with significantly higher throughput than other methods, hyaluronan nanofibers.

The claims stand rejected under 35 U.S.C. 103 over Reneker in view of Gravett, or over Kim in view of Gravett. As acknowledged by the Examiner, neither of Reneker or Kim disclose the use of their process to produce hyaluronan fibers. In fact, Reneker gives merely a generic description of polymers that can be used in their method (which Applicants have pointed out previously is in no way related to electroblowing of the present invention, since Reneker produces a film of their polymers, which is then blasted apart into nanofibers with a gas jet, which is NOT substantially concentrically arranged around the spinneret as required in the present invention) and Kim mentions only a handful of polymers useful in their process (see paragraph [0020] of Kim) none of which are biopolymers such as hyaluronan. The Examiner has used the reference of Gravett to suggest the use of hyaluronan in the methods of either Reneker or Kim.

Gravett discloses perivascular wraps used for maintaining or improving the integrity of body passageways following surgery. In various locations within Gravett, the use of a variety of polymers is disclosed with respect to the carrier, or as a mesh. Hyaluronan is mentioned as one potential member of biodegradable polymer that can be used. The examiner has further relied on paragraph [0116] of Gravett which discloses various generic techniques that can be used to generate the fibers used to form the mesh or carrier of Gravette, including melt-processing techniques such as electrospinning, gel state spinning, melt spinning, compression molding, melt-blowing or wet-laying. However, the Examiner's reliance on Gravett as disclosing the preparation of hyaluronan is misplaced, since, as noted above, it is well known in the art that hyaluronan is notoriously difficult to spin in high throughput. Further, Gravett does not address the spinning of nanofibers, but instead of

normal denier fibers which are more readily produced using higher viscosity spinning solutions due to the larger spinneret holes used.

The Examiner has failed to take into account the difficulties inherent with hyaluronan spinning, particularly spinning of hyaluronan into nanofibers in high throughput. The present inventors were the first to recognize that by combining aspects of melt blowing and electrospinning to provide the present invention electroblowing process, can one achieve high throughput production of hyaluronan nanofibers. The disclosure of Gravette nowhere specifies or exemplifies any method for production of hyaluronan fibers, much less nanofibers. One of ordinary skill would not therefore be motivated to pluck hyaluronan or hyaluronan containing polymers from the listing in Gravette, for use in either Reneker or Kim's process. Accordingly, the rejections should be withdrawn.

The Examiner has objected to the Oath or Declaration of the present application on the basis that the specification has not been adequately identified. However, this is not correct. MPEP 602(VI) states:

The following combination of information supplied in an oath or declaration filed on the application filing date with a specification are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 CFR 1.63:

(A) name of inventor(s), and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration on filing;

(B) name of inventor(s), and attorney docket number which was on the specification as filed; or

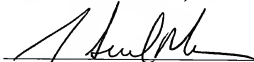
(C) name of inventor(s), and title of the invention which was on the specification as filed.

The Declaration filed with the present application contains adequate identifying information under part (B) of the above passage. In particular, the inventors names are provided, as well as the attorney docket number under which the application was filed (239709US), as well as additional indentifying information that is also application specific, namely the filing date and US Serial no. Accordingly, no new Oath or Declaration is necessary, as Applicants have met the requirements and the Declaration already filed adequately identifies the present application. Accordingly this objection should be withdrawn.

Applicants submit that the application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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